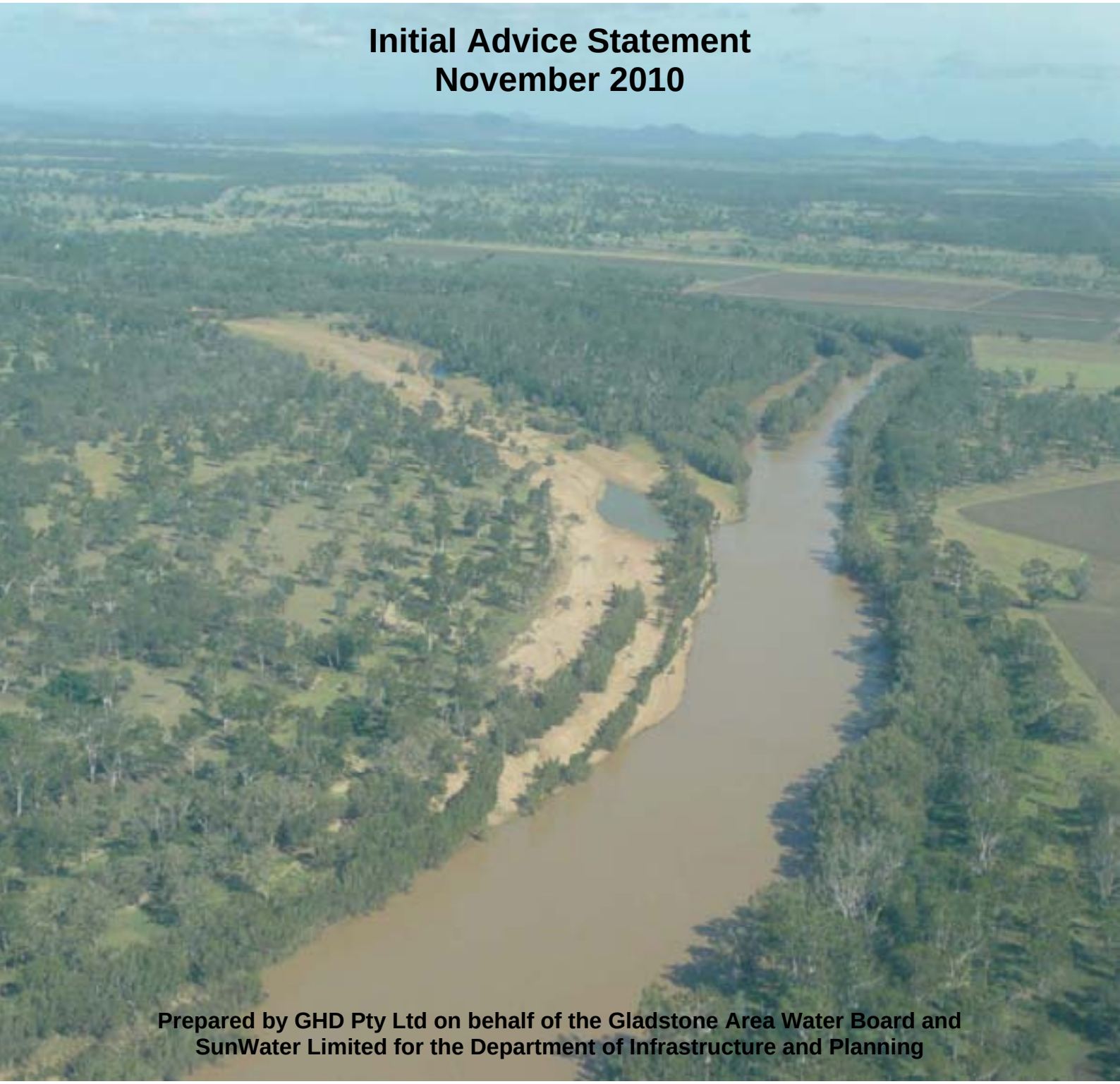
LOWER FITZROY RIVER
INFRASTRUCTURE PROJECT

Initial Advice Statement
November 2010



Prepared by GHD Pty Ltd on behalf of the Gladstone Area Water Board and SunWater Limited for the Department of Infrastructure and Planning

SunWater
Making Water Work

Gladstone Area Water Board

LOWER FITZROY RIVER
INFRASTRUCTURE PROJECT

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Appendix A EPBC Act Protected Matters Search

Acronyms

ACH Act	*Aboriginal Cultural Heritage Act 2003 (Qld)*	**GHD**	GHD Pty Ltd
AHD	Australian Height Datum	**GQAL**	Good Quality Agricultural Land
BoM	Bureau of Meteorology	**IAS**	Initial Advice Statement
CHMP	Cultural Heritage Management Plan	**LFRIP**	Lower Fitzroy River Infrastructure Project
CHRC	Central Highlands Regional Council	**LOS**	Levels of Service
CQRWSS	Central Queensland Regional Water Supply Strategy	**MCU**	Material Change of Use
DEEDI	Department of Employment Economic Development and Innovation	**NC Act**	*Nature Conservation Act 1992 (Qld)*
DERM	Department of Environment and Resource Management	**RE**	Regional Ecosystem
DEWHA	Department of Environment, Water, Heritage and the Arts (formerly)	**ROP**	*Fitzroy Basin Resource Operation Plan 2004* (amended July 2009 version 2)
DIP	Department of Infrastructure and Planning	**RRC**	Rockhampton Regional Council
DSEWPC	Department of Sustainability, Environment, Water , Population and Communities	**SDPWO Act**	*State Development and Public Works Organisation Act 1971 (Qld)*
EIS	Environmental Impact Statement	**SPP**	State Planning Policy
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Cth)*	**ToR**	Terms of Reference
FSL	Full Supply Level	**WRP**	*Water Resource (Fitzroy Basin) Plan 1999*
GAWB	Gladstone Area Water Board		
GBRWHA	Great Barrier Reef World Heritage Area		
GFP	Gladstone-Fitzroy Pipeline		

Executive Summary

This Initial Advice Statement has been prepared by the Gladstone Area Water Board and SunWater Limited, as Proponents for the business case phase of the proposed Lower Fitzroy River Infrastructure Project (the project). The proposed project comprises raising the Eden Bann Weir and constructing a new weir at Rookwood on the Fitzroy River, central Queensland. The Fitzroy River forms at the confluence of the Mackenzie and Dawson Rivers flowing out into the Great Barrier Reef World Heritage Area and Marine Park, some 300 kms downstream. Areas potentially directly affected by the proposed infrastructure are upstream of Rockhampton.

Eden Bann Weir (Stage 1) was built in 1994 to RL 14.5 m. It is proposed that a Stage 2 raise will be to RL 18.2 m and the addition of gates as Stage 3 will raise the structure to RL 20.2 m. The proposed Rookwood Weir is a new build with Stage 1 infrastructure developed to RL 45.5 m. Addition of gates as Stage 2 will raise the weir to RL 49 m.

The Initial Advice Statement aims to identify potential environmental, social and cultural issues, as well as regulatory approvals relating to the development of the proposed project sufficient to enable the Coordinator-General to determine whether the project meets the criteria for declaration as a "Significant Project" under the *State Development Public Works Organisation Act 1971 (Qld).* The Initial Advice Statement also aims to provide sufficient detail to enable regulatory agencies and other stakeholders to have effective input in establishing Terms of Reference for an Environmental Impact Statement for the project; and provide information to key stakeholders and other interested parties as to the project's scope and objectives.

The Department of Environment and Resource Management's Central Queensland Regional Water Supply Strategy (2006) identified that the short- to medium-term urban and industrial water resource needs of the Lower Mackenzie-Fitzroy sub-region cannot be met by water trading and/or efficiency measures alone. In order to meet water resource requirements, it is expected that the proposed project would allow for the capture and storage of unallocated water resources that are available in the system (76,000 ML/a). This unallocated resource includes:

- Reservation of up to 30,000 ML/a of reliable water for urban and industrial use for Gladstone Area Water Board;
- Reservation of 4,000 ML/a of reliable water for urban needs on the Capricorn Coast; and
- Reservation of the balance (estimated to be 42,000 ML/a) for urban, industrial and agricultural purposes in the lower Fitzroy and other systems.

The project is included within the Program of Works, Statewide Water Grid Regional Infrastructure Projects under Part 3 of the *State Development and Public Works Organisation Act 1971 (Qld)*.

The project is likely to be staged, with sequencing and timing dependant on a number of demand triggers including existing and new consumers, drought conditions and security of supply requirements. The project will be implemented by way of a flexible strategy to allow the rapid delivery of water to meet anticipated future demands, when triggered.

On 7 January 2010 the Commonwealth's Department of Sustainability, Environment, Water, Population and Communities (formerly the Department of Environment, Water, Heritage and the Arts), declared that the proposed action is a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act*

1999 (Cth). The *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* required the project to be assessed by means of an Environmental Impact Statement. This assessment will run independently from, but concurrently to, the State approval processes.

Construction of the weirs along the Fitzroy River will include the installation of fauna passage structures and/or measures where applicable and practicable (in consultation with the Department of Employment, Economic Development and Innovation and the Department of Environment and Resource Management, as well as the use of existing and the construction of new access roads to the weir sites.

The potential inundation area (within the bed and banks of the river) associated with development of a weir at Rookwood Crossing extends into the Mackenzie and Dawson Rivers. Inundation areas will potentially impact on public and private infrastructure, such as roads (tracks) and river crossings (low level bridges and causeways). Augmentation may be required to accommodate raised water levels.

Impacts arising during the construction phase of the project relate largely to disturbance (erosion) and nuisance type impacts (such as noise and dust) as a result of land clearing, site mobilisation and physical construction of the infrastructure. Construction phase impacts are considered to be of short-term duration (two years).

Medium- and long-term impacts arising during the operational phase may be as a result of: the weir infrastructure itself acting as a barrier; inundation/ponding behind the weir; and altered flow regimes.

The area directly affected by the Lower Fitzroy River Infrastructure Project is located on the borders between Rockhampton Regional Council, Central Highlands Regional Council and parts of Woorabinda Aboriginal Shire Council. Eden Bann Weir and the Rookwood site are located in a rural area, with beef cattle grazing the predominant land use.

The Eden Bann Weir is located along the border of the Brigalow North and Brigalow South Bioregions. Both Bioregions are characterised by the presence of Brigalow (*Acacia harpophylla*) and incorporate a variety of landscapes ranging from undulating hills, low ridges and valleys to flat alluvial plains. The Rookwood site is located in the northern extent of the Brigalow Belt South Bioregion which contains a variety of landscapes ranging from undulating hills, low ridges and valleys to flat alluvial plains and is characterised by high levels of habitat loss. Vegetation and fauna communities at both Eden Bann Weir and Rookwood have declined significantly due to agricultural clearing. Habitat reserves within the region are highly fragmented. The riparian fringe is typically narrow adjacent to grazing areas.

Conservation significant aquatic fauna known to occur in the proposed project area include the Fitzroy River turtle (*Rheodytes leukops*) and estuarine crocodile (*Crocodylus porosus*). Two endemic fish species (southern saratoga (*Scleropages leichardti*) and leathery grunter (*Scortum hillii*)), and one endemic fish sub-species (golden perch (*Macquaria ambigua oriens*)) also occur within the proposed project area.

The proposed project is anticipated to impact terrestrial and aquatic flora and fauna. Potential social impacts that may be experienced may include the loss of land and loss of access to land will also feature. Desktop research and technical studies will further identify potential impacts, including traffic network disruptions and transport infrastructure requirements. Where avoidance of impacts is not possible mitigation measures will be put in place to minimise and manage potential impacts in accordance with measures identified in the Environmental Impact Statement. Employment opportunities associated with the construction phase will provide benefit to the local area and further positive impacts are anticipated to be associated with improved water security at a regional level promoting regional development in the longer-term.

The project has the potential to bring positive impacts to the area by raising employment levels during the construction phase and securing future water supplies and improving water security at a regional level in the medium- to long-term, thus realising the outcomes of the Central Queensland Regional Water Supply Strategy.

1 Introduction

1.1 Background

The proposed Lower Fitzroy River Infrastructure Project (LFRIP) (the project) is identified in the Department of Infrastructure and Planning's (DIP) Program of Works, Statewide Water Grid Regional Infrastructure Projects (2007). The project primarily comprises raising Eden Bann Weir and construction of a weir at Rookwood on the Fitzroy River in central Queensland (Figure 1).

A water resource plan for the Fitzroy Basin (*Water Resource (Fitzroy Basin) Plan 1999*) (WRP) is currently under review. The plan aims to provide a balance between environmental needs and consumptive use of water and identify potential water resources available for allocation (Queensland Government Department of Natural Resources and Water, 2006). The *Fitzroy Basin Resource Operations Plan 2004* (ROP) (developed to implement the WRP) determined that the quantities of unallocated water available would be subject to a WRP amendment (to include overland flow) and the development of a Central Queensland Regional Water Supply Strategy (CQRWSS). The CQRWSS (published in 2006) presented the preferred regional water supply planning options identified through the Central Queensland Regional Water Supply Study.

Regional strategy responses, such as increasing water supplies through the release of unallocated water and a sub-regional strategy for the lower Mackenzie-Fitzroy region, recognised the need for further infrastructure development on the Fitzroy River to reliably meet the region's water demand needs, are of relevance to the proposed LFRIP.

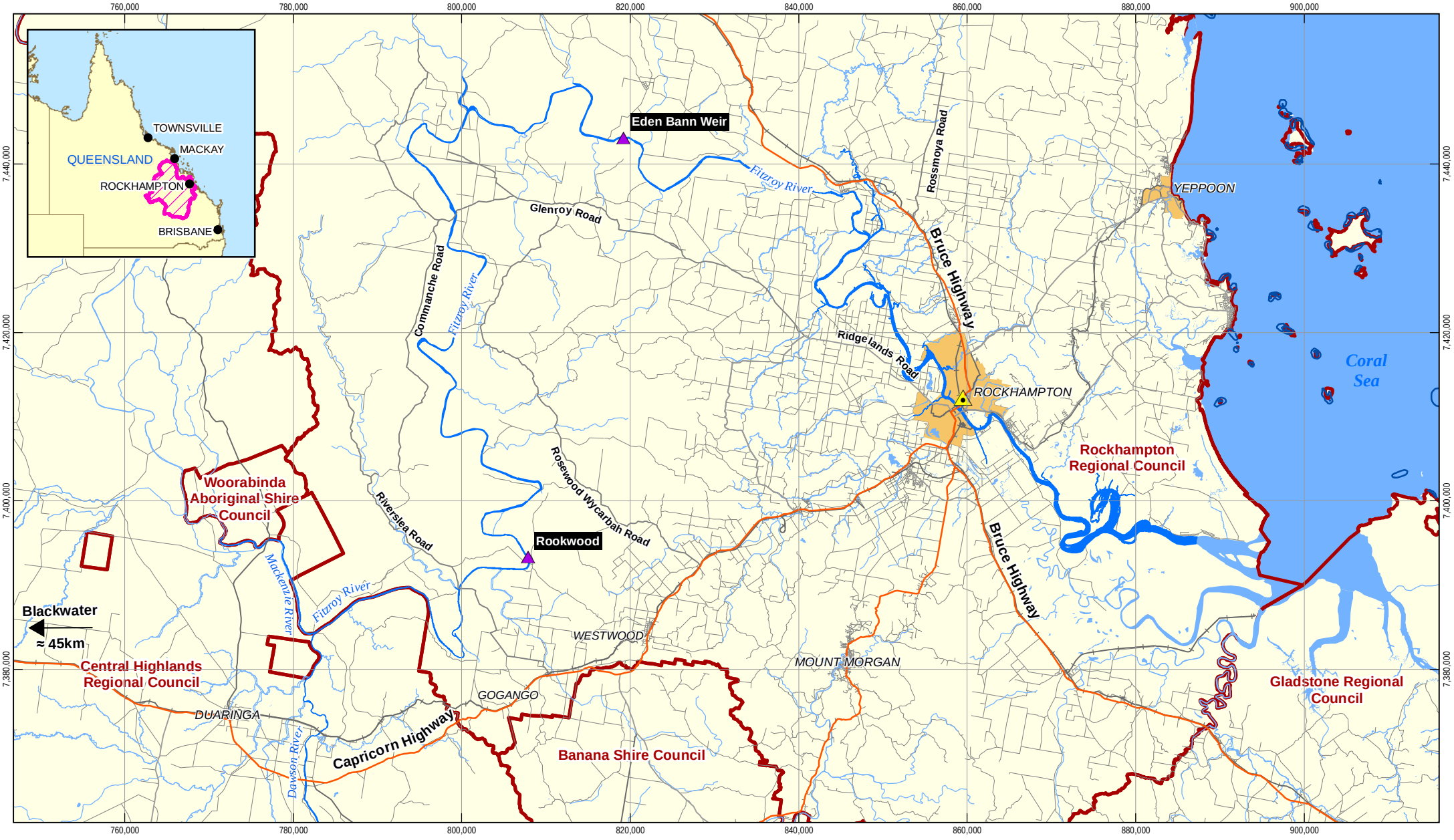
In the short- to medium term (2010 to 2015) it was identified that further investigations into the raising of Eden Bann Weir and constructing Rookwood Weir were required. In the longer term (2020), together with water trading and water efficiency gains, it is expected that urban, industrial and agricultural demands will be met by the development of the LFRIP.

To give effect to the outcomes of the CQRWSS, the Governor in Council (on 13 December 2007), under Part 3 of the *State Development and Public Works Organisation Act 1971 (Qld)* (SDPWO Act) established a Program of Works, Statewide Water Grid Regional Infrastructure Projects. The preparation of a business case for the LFRIP is included in the Program of Works.

Specifically, the Proponents, Gladstone Area Water Board (GAWB) and SunWater Limited (SunWater), have been directed to prepare a business case and undertake technical and environmental investigations into development of water storage infrastructure to capture and store in the order of 76,000 ML/a of unallocated water.

Concept level investigations were commissioned and undertaken during 2007 and 2008. Based on the outcomes of these studies, further investigations were commissioned in late 2008 to progress technical aspects (preliminary design) of the project, to facilitate obtaining environmental approvals and to develop a final business case[1]. A preliminary business case was developed and submitted to DIP in November 2009.

[1] For the purposes of this document, the term "business case" is taken to be the activities and reports as determined in the Statewide Water Grid Regional Infrastructure Projects' Program of Works. The business case is intended to be a decision making tool providing detailed analysis on economic and financial issues, public interest issues, policy implications, Native Title, Cultural Heritage and potential environmental impacts relating to the project.



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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA94)
Grid: Map Grid of Australia 1994, Zone 55

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LEGEND

- Proposed Weir Location
- Fitzroy Barrage
- Waterway
- Highway
- Major Road
- Minor Road
- River of Interest
- Fitzroy Basin
- LGA Boundaries
- Urbanised Area

Gladstone Area Water Board, SunWater
Lower Fitzroy River Infrastructure Project

Job Number 41-20736
Revision F
Date 03 SEP 2010

Project Location

Figure 1

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Level 6, 145 Eagle Street Brisbane QLD 4000 Australia T +61 7 3316 3000 F +61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

1.2 Proponents

Gladstone Area Water Board (GAWB) and SunWater Limited (SunWater) together are the designated Proponents for the business case stage of the LFRIP.

On 1 October 2000 GAWB commenced operations as a Category 1 commercialised Water Authority under the *Water Act 2000 (Qld)*, responsible to the Minister for Water. As from 1 July 2008, GAWB became a registered service provider under the *Water Supply (Safety and Reliability) Act 2008 (Qld)*. GAWB owns and operates Awoonga Dam on the Boyne River along with a network of delivery pipelines, water treatment plants and other bulk water distribution infrastructure in the Gladstone Region in central Queensland. GAWB holds an allocation of 78,000 ML per annum from Awoonga Dam by virtue of a Resource Operations Licence issued pursuant to the *Water Resource (Boyne River Basin) Plan 2000* (GAWB, 2009). GAWB's corporate objective is to ensure that the long- and short-term water needs of current and future customers are met in ways that are environmentally, socially and commercially sustainable.

SunWater was established as a statutory Government Owned Corporation on 1 October 2000 under the *Government Owned Corporations Act 1993 (Qld)*. SunWater owns and operates the Queensland Government's bulk water supply and distribution infrastructure located throughout regional Queensland. SunWater manages 40% of commercially used water in Queensland via twenty-three water supply schemes and three subsidiary companies. Under the Resource Operations Licence and interim Resource Operations Licences held, SunWater manages a total water allocation of 2.82 million ML. SunWater provides a range of services including infrastructure ownership, water delivery, operation and maintenance of infrastructure and engineering consultancy services. SunWater's Environmental Management System ensures that best practice environmental management and compliance is achieved across the business in accordance with AS/NZS ISO14001:2004 (SunWater, 2009).

1.3 Project contact details

Project Manager

The Lower Fitzroy River Infrastructure Project

Reply Paid 668, Brisbane QLD 4001

Freecall 1800 423 213

Website **www.fitzroyweirs.com.au** and email **fitzroyweirs@ghd.com.au**

1.4 Purpose and scope

The Initial Advice Statement (IAS) has been prepared to:

- Enable the Coordinator-General to determine whether the project meets the criteria for declaration as a "Significant Project" under the SDPWO Act;
- Provide sufficient detail to enable regulatory agencies and other stakeholders to have effective input in establishing Terms of Reference (ToR) for an Environmental Impact Statement (EIS) for the project; and
- Provide information to key stakeholders and other interested parties as to the project's scope and objectives.

1.5 Approvals process

1.5.1 Commonwealth approvals

A referral was made to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) (formerly the Department of Environment, Water, Heritage and the Arts or DEWHA) for assessment under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act) on 22 October 2009 (EPBC 2009/5173). A determination was made on 7 January 2010 that the proposed project was a 'controlled action'. The controlling provisions for the proposal under the EPBC Act are:

- World Heritage properties (sections 12 and 15A);
- National Heritage places (sections 15B and 15C);
- Listed threatened species and communities (sections 18 and 18A); and
- Listed migratory species (sections 20 and 20A).

It was also determined that an EIS would be required for the proposal and Terms of Reference (or guidelines) were published in June 2010. An EIS to address potential impacts on Commonwealth matters of National Environmental Significance is currently being prepared.

1.5.2 State Development and Public Works Organisation Act 1971 (Qld)

The IAS is part of the application for declaration as a significant project under section 26(1) of the SDPWO Act. Should the Coordinator-General declare the LFRIP to be a 'significant project' it is expected that the EIS process under Part 4 of the SDPWO Act will be applied as the most appropriate mechanism for environmental assessment and approval of the project.

Given that the environmental assessment process with the Commonwealth is already well progressed, it is not envisaged that a bilateral process will be invoked. It is envisaged that the Commonwealth and State EIS processes will run independently but concurrently and that programs will be aligned as far as is practicable and as agreed between the Commonwealth and the State.

1.5.3 Other State approvals

Aside from the SDPWO Act the following State instruments are considered significantly relevant to the LFRIP:

- *Water Act 2000* and *Water Supply (Safety and Reliability) Act 2008*;
- *Sustainable Planning Act 2009* and *Sustainable Planning Regulations 2009*;
- *Environment Protection Act 1994* and *Environmental Protection (Water) Policy 2009*;
- *Vegetation Management Act 1999* (VM Act);
- *Nature Conservation Act 1992* (NC Act);
- *Forestry Act 1959*;
- *Fisheries Act 1994*;
- *Land Title Act 1994*;

- *Land Protection (Pest and Stock Route Management) Act 2002*;
- *Aboriginal Cultural Heritage Act 2003* (ACH Act), *Native Title (Queensland) Act 1993* and the *Queensland Aboriginal Land Act 1991*, as amended by the *Aboriginal and Torres Strait Islander Land Amendment Act 2008*;
- State Planning Policies (SPP), for example, SPP1/92 - Development and the Conservation of Agricultural Land and SPP1/09 - Reconfiguration of a Lot Code for Land in Indigenous Local Government Areas to which a Local Planning Scheme does not Apply; and
- Regional Plans, for example, Central Queensland Regional Growth Management Framework (Central Queensland Regional Plan).

1.5.4 Other environmental and planning approvals

Following assessment of the business case and a decision to proceed with the project, a number of approvals may be required (but not limited to), for example:

- Material Change of Use (MCU) for Environmentally Relevant Activities such as chemical storage, extractive activities (dredging, extraction and screening), and concrete batching;
- Resource entitlements for State resources;
- Operational works such as for clearing of assessable vegetation; for taking and interfering with water (under the *Water Act 2000*); and for constructing or raising a waterway barrier;
- A Development Permit for quarrying in a watercourse;
- A Cultural Heritage Management Plan (CHMP) under the ACH Act;
- A Riverine Protection Permit; and
- A permit to clear native plants under the NC Act.

1.5.5 Local government areas

The Eden Bann Weir and its associated inundation areas fall within the Rockhampton Regional Council (RRC) local government area (Figure 1), specifically the former Livingstone and Fitzroy Shires. Development is currently assessed under the *Livingstone Shire Planning Scheme 2005* and *Fitzroy Shire Planning Scheme 2005*. Development within the 'rural zone' is considered a MCU within the former Livingstone Shire and is deemed impact assessable. However, development that is a MCU within the former Fitzroy Shire is considered exempt from assessment.

The proposed site for Rookwood Weir lies within the RRC local government area (specifically the former Fitzroy Shire). Inundation associated with Rookwood borders parcels of the Woorabinda Aboriginal Shire Council and sections of Central Highlands Regional Council (CHRC) (Figure 1), specifically the former Duaringa Shire. Under the *Fitzroy Shire Planning Scheme 2005* and *Duaringa Shire Planning Scheme 2007*, the proposed project areas are considered to be within the 'rural zone'. Development of this type in the former Fitzroy and Duaringa Shires is considered exempt from assessment. The Woorabinda Aboriginal Shire Council area is approximately 170 km south west of Rockhampton and is a Deed of Grant in Trust Aboriginal community. No planning scheme or associated policies are currently in place in the council area.

1.5.6 Water resource planning

The LFRIP will be governed by the Fitzroy Basin WRP (currently under review). As subordinate legislation, water resource plans are replaced at ten year intervals with the WRP currently under review. The finalised plan will be implemented by amending the ROP. Development and operation of the proposed LFRIP will adhere to the WRP and amendments to the ROP will be required to implement these actions.

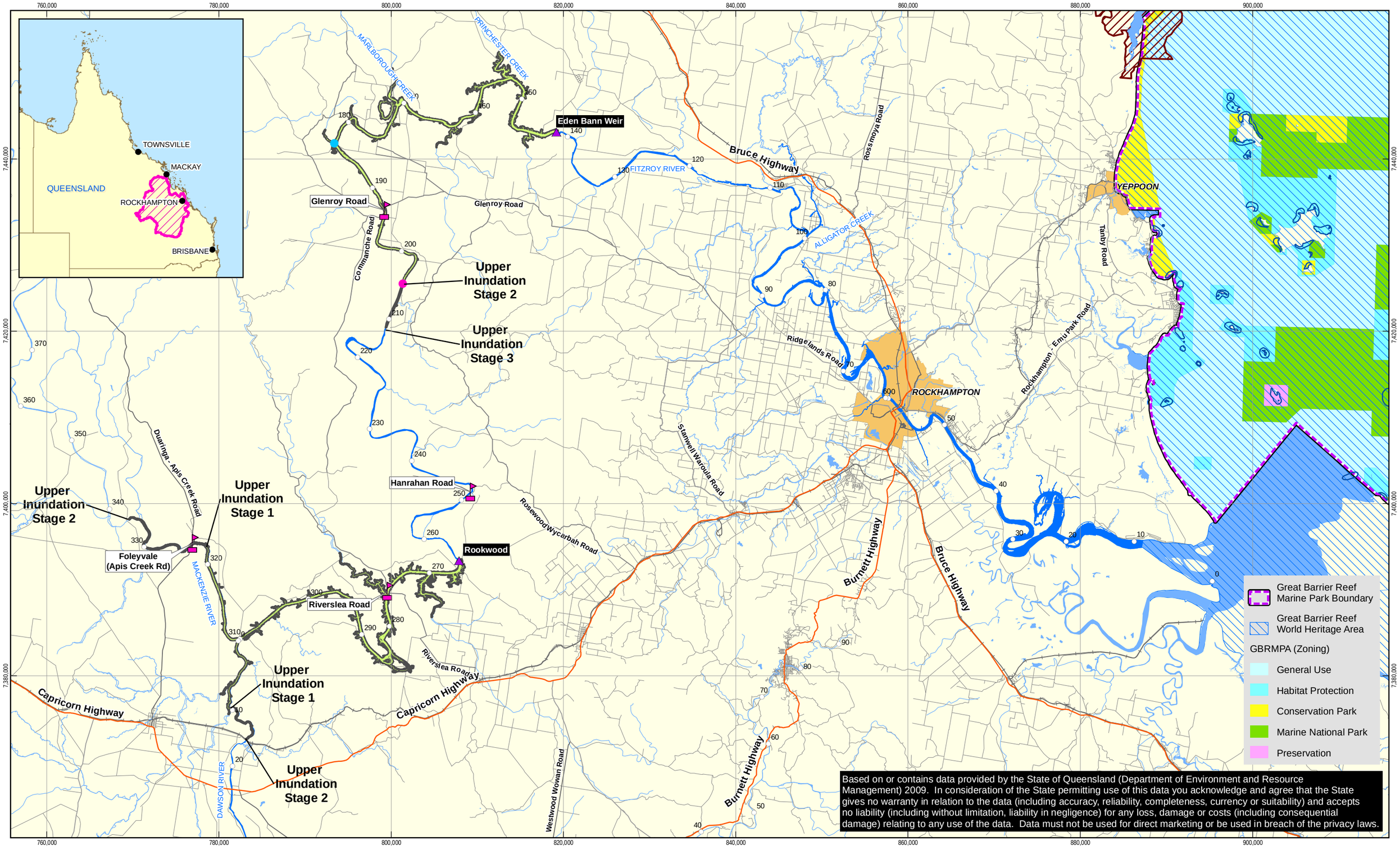
2 Project overview

2.1 Project location

The proposed developments are located along the Fitzroy River, within the Fitzroy sub-catchment, central Queensland. The potential inundation area (within the bed and banks of the river) associated with development of a weir at Rookwood Crossing extends into the Mackenzie and Dawson Rivers. The Fitzroy River forms at the confluence of the Mackenzie (flowing from the north) and Dawson Rivers (flowing from the south) (at 310.3 km AMTD[2]) flowing into the Great Barrier Reef World Heritage Area (GBRWHA) and Marine Park. The Fitzroy River passes through the city of Rockhampton which lies approximately 59 km from the river mouth.

Figure 2 shows the local extent of the Eden Bann Weir and Rookwood Weir.

[2] Adopted middle thread distance means the distance in kilometres, measured along the middle of a watercourse, that a specific point in the watercourse is, either from the watercourse's mouth; or if the watercourse is not a main watercourse, the watercourse's confluence with its main watercourse.



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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)
Grid: Map Grid of Australia 1994, Zone 55

N

- AMTD
- Potentially Affected River Crossing
- Fitzroy Barrage
- Craiglee
- Redbank
- Proposed Weir Location
- Highway
- Major Road
- Waterway
- River of Interest
- Rookwood Inundation Stage 1
- Rookwood Inundation Stage 2
- Eden Bann Inundation Satge 2
- Eden Bann Inundation Satge 3

Gladstone Area Water Board, Sunwater
Lower Fitzroy River Infrastructure Project

Job Number	41-20736
Revision	B
Date	14 SEP 2010

LFRIP Extent

Figure 2

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2.2 Project description

2.2.1 Overview

The LFRIP is proposed to meet and secure future water demands from urban populations, industry and agriculture within Rockhampton and Gladstone Regions and along Capricorn Coast in the short- to medium-term.

In order to allow the LFRIP flexibility to respond to demand triggers (for example drought demand, consumer demand and security of supply) development is likely to be staged to meet incremental demand increases. No decision has yet been made in regards to the order or composition of proposed developments. It is intended that a development matrix will be compiled to allow the LFRIP to respond to a number of different demand scenarios, but ultimately attain the objective of capturing and storing all unallocated water (in the order of 76,0000 ML/a).

The proposed development of the weir infrastructure, the resultant storage of water (inundation within the bed and banks of the river) and the transfer of water between storages on the Fitzroy River comprise the scope of the LFRIP and is summarised in Table 1.

Table 1 Summary of proposed development

Site	Eden Bann Weir			Rookwood	
Stage	**1 (existing)**	**2**	**3**	**1**	**2**
FSL	14.5	18.2	20.2	45.5	49.0
Description	Conventional concrete weir	Raise	Add gates	Construct	Add gates
Construction footprint (ha)	n/a	16		16	
Ancillary work areas[3] (ha)	n/a	32		32	
Potential associated infrastructure	n/a	◗ Glenroy Road and Craiglee river crossings ◗ Site access ◗ Fish passage		◗ Foleyvale, Riverslea and Hanrahan Road river crossings ◗ Site access ◗ Fish passage	
Inundation upstream extent (km AMTD)	184	205	211	10 Dawson 322 Mackenzie	15.7 Dawson 335 Mackenzie

[3] For example, site office, carpark, workshop area, laydown area, material stockpile and concrete batching area, borrow pits and spoil dumps, etc.

Site	Eden Bann Weir			Rookwood	
Stage	**1 (existing)**	**2**	**3**	**1**	**2**
Total inundation (km)	43.0	61.3	68.5	61.2	84.4
Inundation area (ha)	670	1,170	1,690	1,430	1,930
Total storage at FSL (ML)	36,000	67,278	91,626	64,780	117,293
Commandable storage[4] at FSL (ML)	26,260	57,555	81,903	59,492	112,005

The general scope of works for the construction phase may include: river diversion at low flows; dealing with water in excavations; aggregate extraction from the river bed (and elsewhere) and processing for use in concrete production; excavation of overlying soil; excavation of rock for foundation below weir structure; foundation preparation to receive concrete; construction of roller compacted concrete or mass concrete gravity weir section; construction of reinforced concrete outlet works, ogee, piers and fish movement structures; fabrication, installation and commissioning of mechanical equipment for outlet works, weir hinge crest gates and access roads and bridges.

2.2.2 Eden Bann Weir

Stage 1 of Eden Bann Weir was constructed in 1994 on the Fitzroy River at 141.2 km AMTD, with the primary purpose to supply water to Stanwell Power Station. It is a conventional mass concrete gravity weir (Figure 3) with an existing crest level at Full Supply Level (FSL)[5] 14.5 m. Stage 1 construction is approximately 8 m high (river bed to weir crest) and 412 m long. It has a total full supply storage volume of approximately 36,000 ML (confined within the river). The weir accommodates a fish lock (Figure 3) on the left bank adjacent to the outlet works and a 1.5 m diameter outlet conduit. Access for operation and maintenance purposes is via a gravel road on the left bank.

In accordance with the ROP, releases are made from Eden Bann Weir to maintain the water level in the Fitzroy Barrage storage and to allow for the abstraction of water at Laurel Bank to supply Stanwell Power Station (via pipeline). The ROP currently approves a total volume of 3,101 ML medium priority and 25,520 ML high priority supplemented water allocations from the Lower Fitzroy Water Supply Scheme, of which the Eden Bann Weir is a part.

The following staged works are proposed at Eden Bann Weir under the LFRIP:

- Stage 2 comprises construction using conventional concrete to raise Eden Bann Weir to FSL 18.2 m. The associated inundation area equates to 1,170 ha with inundation extending to 205 km AMTD (Figure 2). Upon completion, Stage 2 development will provide a total storage at FSL of 67,278 ML; and

[4] That which is available for use. Excludes 'dead storage'.

[5] All elevations presented at reduced level in metres AHD.

- Stage 3 comprises the addition of 2 m high gates raising the weir to FSL 20.2 m. The total inundation area equates to 1,690 ha with the inundation extending to 211 km AMTD (Figure 2). Upon completion, Stage 3 development will provide a total storage at FSL of 91,626 ML.

Figure 3 Eden Bann Weir

(a) Eden Bann Weir

(b) Eden Bann Weir fishlock

2.2.3 Rookwood Weir site

A feasibility study undertaken in 1999 considered six potential sites between 277.6 km AMTD and 240 km AMTD on the Fitzroy River for suitability of constructing new water storage infrastructure (GHD Pty Ltd (GHD), 1999). A preferred weir site (Rookwood) (Figure 4) was identified at 265.3 km AMTD.

Figure 4 Rookwood site

The following staged works are proposed for Rookwood Weir under the LFRIP:

- Stage 1 comprises construction of a roller compacted concrete weir to FSL 45.5 m. The associated inundation area equates to 1,430 ha with inundation extending along the Fitzroy River to the confluence with the Dawson and Mackenzie Rivers (310 km AMTD), and to 10 km AMTD on the Dawson River and 322 km AMTD on the Mackenzie River (Figure 2). Upon completion, Stage 1 development will provide a total storage at FSL of 64,780 ML; and
- Stage 2 comprises the addition of 3.5 m high gates raising the weir to FSL 49.0 m. The total inundation area equates to 1,930 ha with the inundation area extending to 15.7 km AMTD on the Dawson River and 335 km AMTD on the Mackenzie River (Figure 2). Upon completion, Stage 2 development will provide a total storage at FSL of 117,293 ML.

2.2.4 Ancillary works and associated infrastructure

In addition to weir infrastructure, the LFRIP will include the establishment of construction laydown, batching plant areas and access roads. Augmentation to (and maintenance of) other public and private roads and river crossings may also be required as a result of inundation impacts associated with the LFRIP. Three primary river crossings (fords) have been identified (Figure 2), namely, Glenroy Road Crossing; Foleyvale/Duaringa Apis Creek Road; and Riverslea Road Crossing. Hanrahan Road and Craiglee crossings are situated downstream of the proposed Rookwood site. These crossing are not directly impacted by inundation, but may be impacted during periods of water release between storages.

Associated with the weirs will be fauna passage structures or measures (as applicable and practicable), which are to be developed in consultation with the Fisheries division of the Department of Employment, Economic Development and Innovation (DEEDI) and the Department of Environment and Resource Management (DERM).

Material resources will be required and will potentially be sourced *in situ* and where necessary from sites outside of the immediate project area.

2.2.5 Operational considerations

In addition to construction or augmentation of water supply infrastructure, operating rules will be applied and/or amended to regulate flows, whilst still meeting environmental flow objectives, water security allocation objectives and other criteria in accordance with the WRP and the ROP. Water stored behind the weir wall is contained within the bed and banks of the river and its tributaries.

It is predicted that releases will be made from both Rookwood Weir and Eden Bann Weir downstream to the Fitzroy Barrage for extraction from the Barrage pond.

2.3 Project justification, purpose and need

2.3.1 Central Queensland Regional Water Supply Strategy

The CQRWSS identified that the short- to medium-term urban and industrial water resource needs of the Lower Mackenzie-Fitzroy sub-region cannot be met by water trading and/or efficiency measures alone. In order to meet likely future water resource requirements, LFRIP will allow for the capture and storage of unallocated water resources that are available in the system.

The LFRIP is included within the Program of Works, Statewide Water Grid Regional Infrastructure Projects which was approved by the Governor in Council (13 December 2007), under Part 3 of the SDPWO Act. The Statewide Water Policy aims to “better balance our water supply with the ever increasing demand from urban communities, industry and rural users” (Queensland Government Department of Infrastructure (DIP), 2007).

The policy aims to support economic growth in regional Queensland, specifically (as it relates to the LFRIP):

- By securing water supply for Yeppoon and for industrial and rural uses in Rockhampton; and
- By guaranteeing water supplied to industry in Gladstone.

The CQRWSS anticipates growth in the industrial (Gladstone and the Stanwell-Gladstone Infrastructure Corridor State Development Area) and mining sectors (Bowen and Surat Basins), and subsequent urban development, together with potential irrigated agriculture and intensive livestock production.

The CQRWSS identified several regional strategy responses to address future water needs, namely to maximise the effectiveness of supplies through water trading; maximise the effectiveness of supplies through demand management and more efficient use of water; and increase water supplies through the release of unallocated water.

The CQRWSS identified unallocated water resources in the Fitzroy River in the order of 76,000 ML/a, which includes:

- Reservation of up to 30,000 ML/a of reliable water for urban and industrial use for GAWB;

- Reservation of 4,000 ML/a of reliable water for urban needs on the Capricorn Coast; and
- Reservation of the balance (estimated to be 42,000 ML/a) for urban, industrial and agricultural purposes in the lower Fitzroy and other systems.

The 'unallocated' water reflects the potential to take additional unsupplemented water without impacting the objectives of the WRP. The ROP acknowledges that this generally represents a low reliability resource and that it is likely that useful access to this water will require significant new storage infrastructure, either in or off stream to reliably accommodate this water. The CQRWSS further identified that the short- to medium-term urban and industrial needs of the Lower Mackenzie-Fitzroy sub-region cannot be met by trading or efficiency measures alone and will require additional storage infrastructure on the Fitzroy River in order to capture and store available but as yet unallocated resources. Augmentation of Eden Bann Weir and construction of a weir at Rookwood were identified as possible solutions.

In the longer term, together with water trading and improved water use efficiency, the CQRWSS predicts the development of infrastructure on the Fitzroy River will need to operate in conjunction with other central Queensland infrastructure, such as the existing Fitzroy Barrage and Awoonga Dam and the proposed Nathan Dam, Connors River Dam and Gladstone-Fitzroy Pipeline (GFP), to improve the overall performance of the system.

2.3.2 Demand forecast

Demand for water may be triggered as a result of drought, consumer demand or the need to improve the reliability and security of supply. The following represent the key areas of potential water demand for the LFRIP. All demands stated are for high priority allocation.

- GAWB is currently undertaking the development of the GFP project, designed to transfer 30,000 ML/a from the lower Fitzroy River to the City of Gladstone. The GFP was also identified in the CQRWSS and is included in the Program of Works. This water supply is essential to increase the reliability of supply to the region and meet additional demand that GAWB will be unable to service under existing supply arrangements from Awoonga Dam. GAWB has implemented a contingent supply strategy and the GFP is the primary vehicle for delivery of an alternative water supply from the Fitzroy River.
- RRC, through Fitzroy River Water, owns and operates the Fitzroy Barrage which currently has an allocation of 50,000 ML/a, generating supply reliability of 99.6%. Rockhampton City therefore is exposed to a potential supply shortfall under an extreme drought scenario.

  Whilst the existing reliability of less than 100% highlights the supply issues facing Rockhampton City, the RRC's ultimate demand for additional yield from the LFRIP will be subject to its required Levels of Service (LOS), which has yet to be determined. A Yield Hydrology Working Group has been formed by DERM to determine the LOS requirements. The LOS will be converted into a volumetric demand on the project.
- The Fitzroy Industry and Infrastructure Study was initiated to facilitate major industry development in the Rockhampton-Fitzroy area by planning for the infrastructure needs of strategic development opportunities. It identified that potential existed for approximately ten 15,000-head cattle feedlots to be located within a lower Fitzroy agricultural corridor.

It is expected that the corridor may also support fodder production as an input into the feedlots. Areas suitable for crops such as citrus, grapes and vegetables were also identified. In the long-term, there is opportunity to establish large piggeries if market demand is strong.

Due to uncertainty surrounding the agricultural demand profile, projected demands are not reported in ML.

- The demand for water from industrial projects throughout the Rockhampton Region is not expected to be significant. Whilst regional planning for the development of future infrastructure has been undertaken, notably in the form of the Gracemere-Stanwell Industrial Corridor, none of the expected projects have yet to materialise. To date a potential demand of 3,000 ML has been identified.

  Industrial demand within Gladstone is expected to be far more significant, and these demands are catered for in the 30,000 ML being sought by GAWB.

Given that estimates of water demand are based on analysis of planned and known regional development and that market conditions play a significant role in realising these developments, the accuracy of water demand estimates are limited and variable over time, requiring continuous monitoring and adjustment. As such the LFRIP is proposed for development in such a way that it has a flexible strategy to allow the delivery of water quickly to meet anticipated future demands when these are triggered. Consequently the project is likely to be staged, with sequencing (development levels) and timing depending on demand triggers including existing and new consumers, drought conditions and security of supply requirements.

2.4 Project alternatives

Various strategies and sub-strategies have been identified to improve water supply reliability and meet anticipated demands into the future. Based on the outcomes of the CQRWSS and in accordance with the Program of Works, only the Fitzroy Barrage, Eden Bann Weir and Rookwood were considered further in terms of the LFRIP.

Alternatives to the current proposed works have been investigated on several levels including:

- Investigation of a range of options to meet likely future water demand in central Queensland, through the CQRWSS; and
- Investigations of alternative infrastructure combinations and locations for weirs on the Fitzroy River, through the LFRIP.

Having identified that new or raised weir infrastructure was required to meet anticipated future demand, further studies have also been undertaken as to the locations and configurations for this infrastructure, namely:

- GHD (1999) undertook a feasibility study for a weir on the Fitzroy River and considered six sites between 277.6 and 240 km AMTD (Figure 2). The Rookwood site was identified as being most favourable;
- Reappraisal of the 1999 (GHD, 1999) feasibility study in 2003 and 2005 (GHD, 2003 and 2005) included an update of the cost estimates and redesign of the outlet works;
- Further geotechnical and engineering appraisal of the site was undertaken in 2006 (GHD, 2007a);

- A multi-disciplinary (technical, environmental, social and economic) workshop approach was used[6] to further progress optimal development configurations and levels at both Eden Bann Weir and Rookwood (individually and in combination) in order to achieve the proposed project objectives; and
- Yield and storage volume of an augmented (raised) Fitzroy Barrage were also considered, but were found to be inadequate. Environmental, social and economic considerations did not favour incorporation of this infrastructure into the proposed project.

Investigations to date conclude that reservation of all unallocated water (76,000 ML/a) would be achieved through raising Eden Bann Weir and constructing a weir at Rookwood. Therefore, the outcome is a strategy that is flexible enough to stage development in response to growing demand, allowing the Proponents to be able to deliver water quickly to meet these anticipated future demands.

2.5 Community and stakeholder consultation

A comprehensive community consultation program has been developed for the LFRIP. Community consultation will continue to take place throughout the EIS process with the community and government agencies being invited to comment on draft ToR and the EIS.

A project website, Reply Paid postal address and a free-call phone number have been established for stakeholder and community input (refer section 1.3). To date a project newsletter to announce the project and two project updates (Spring 2009 and Autumn 2010) have been distributed and community information sessions held in Rockhampton and Gogango during the period 7-10 October 2009. A number of agency briefings have been held at National and State level, including with regional offices.

3 Existing environment

3.1 Land use, land tenure and ownership

Eden Bann Weir and the Rookwood site are located in a rural area, with beef cattle grazing the predominant land use. Large rural properties within the area are generally served by unsealed roads, branching from the major arteries of the Bruce and Capricorn Highways (Figure 1).

The land directly affected by the Eden Bann Weir (and associated inundation) is zoned for rural uses (under both the *Fitzroy Shire Planning Scheme 2007* and the *Livingstone Shire Planning Scheme 2005*). Most land adjoining the river is currently Freehold Land. The existing weir footprint lies within a Perpetual Lease held by SunWater. The land directly affected by the Rookwood site is also currently zoned for rural uses (under the *Fitzroy Shire Planning Scheme 2005*) and is Freehold Land.

For the most part, water stored behind the weir wall is contained within the bed and banks of the river which is classed as unallocated State land.

Inundation areas associated with Rookwood are zoned for rural uses under the former *Fitzroy Shire Planning Scheme 2005* and the former *Duaringa Shire Planning Scheme 2007*. Sections of the inundation area could potentially also fall within Woorabinda Aboriginal Shire Council land. No planning scheme or associated policies are currently in place in the council area.

[6] Workshops were held in November 2008 and January 2009 and attended by the Proponents, State Government Agencies and GHD.

The surrounding lands upstream and downstream of the weirs are also zoned 'rural' and are mainly Freehold Land with some parcels of lands leased. The development of the LFRIP is compatible with the rural zoning in the study area.

3.2 Socio-economic environment

The area directly affected by the LFRIP is located on the borders between RRC, CHRC and parts of Woorabinda Aboriginal Shire Council. For the most part, the direct social impacts associated with the LFRIP will be experienced by people owning or operating land within or adjacent to the project area.

The main land use activity occurring on potentially affected properties is cattle breeding and grazing. There is also some crop cultivation, and a small number have irrigation licences. The most common usage of the river is for stock watering.

The local study area is predominantly rural with a few small localities such as Duaringa, Gogango and Westwood (Figure 1). Infrastructure and services are limited to utilities, roads and crossings, police and primary schools. The roads and crossings over the Fitzroy, Mackenzie and Dawson Rivers are particularly important to the community, as they provide the only access to Rockhampton for many residents. Residents in the local study area regularly travel to Rockhampton to access services.

Recreational activities are largely confined to the lower reaches of the Fitzroy River, specifically within the Fitzroy Barrage pond. Activities such as recreational fishing and kayaking are known to occur here. Access to river reaches within the LFRIP area is restricted due to large private landholdings and limited public roads.

Cook *et al* (2007) identified that a "striking characteristic of the Fitzroy River is that it floods regularly and there are periodically extremely major floods". It is consequently acknowledged that landholders from the time of early settlement realised the importance of locating buildings away from the river banks.

3.3 Native Title and Indigenous cultural heritage

Native Title searches revealed that a number of claims exist (or did exist) over the project area. These include Darumbal People (claims QC97/21; QUD6131/98 and QC99/01; QUD6001/69); Gangulu People (former claim QC97/36; UD6144/98); Kangoulu People (former claim QC98/25; QUD6195/98); and Ghungalu People (former claim QC99/16; QUD6226/98). In addition, a portion of the project area was not the subject of a claim, however, following public notification and discussion with the aforementioned parties, the Jetimarala People were identified as custodians.

3.4 Physical environment

3.4.1 Climate

Strong seasonal climatic factors heavily influence flows within the Fitzroy Basin, with the sub-tropical climate fostering the majority of rainfall during the wet season (December through to February). The warm wet seasons are generally followed by long dry seasons (March to November). Severe flooding frequently occurs within the Fitzroy Basin due to the large size of the catchment and as a result of intense rainfall events associated with storms, cyclones and tropical low pressure systems. Prolonged dry conditions and drought are also characteristic features of the highly variable and unpredictable nature of the Fitzroy Basin climate.

Mean rainfall ranges from less than 23 mm in July to 143 mm in February. Mean annual rainfall (measured at Rockhampton) is approximately 800 mm per annum (Bureau of Meteorology (BoM), 2010).

Mean maximum temperatures range from 23^{o}C in July to 32^{o}C in December. Mean minimum temperatures range between 9.5^{o}C in July and 22^{o}C in January/February (BoM, 2010).

Humidity is indicative of the subtropical location and is generally high ranging from 62% in October/November to 73% in February (BoM, 2010).

3.4.2 Soils and geology

There are six broad land resource types that dominate the Fitzroy Catchment Area. These are hilly non-agricultural land (20% of the area), rolling eucalyptus plains (33%), brigalow or softwood scrub on deep cracking clay soils (24%), open eucalyptus downs on shallow cracking clay soils (11%), a range of eucalypt and brigalow floodplain areas (10%), and marine plains and coastal dunes (2%).

In general there are five major soil groups common throughout the region, namely chromosols, dermosols, kanosols, sodosols and vertosols (Queensland Government Department of Natural Resources, 1997).

Good Quality Agricultural Land (GQAL) in the project area is varied. The LFRIP is not considered to significantly impact on GQAL.

The Eden Bann Weir section of the Fitzroy River occurs along the border of the Brigalow Belt North and Brigalow Belt South Bioregions. These Bioregions contain a variety of landscapes ranging from rugged ranges, undulating hills, valleys and flat alluvial plains with mixed geology. The Brigalow Belt North consists of Permian volcanics and Permian-Triassic sediments of the Bowen and Galilee basins, Carboniferous and Devonian sediments and volcanics of the Drummond Basin, Cambrian and Ordovician rocks of the Anakie inlier and associated Tertiary deposits (DEWHA, 2009a). The Brigalow Belt South is predominantly Jurassic and younger deposits of the Great Artesian Basin and Tertiary deposits with elevated basalt flows (DEWHA, 2009b).

Rookwood occurs in the northern extent of the Brigalow Belt South Bioregion. This Bioregion extends from Rockhampton in central Queensland to Dubbo in western New South Wales. The Bioregion contains a variety of landscapes ranging from undulating hills, low ridges and valleys to flat alluvial plains. Geology is predominantly Jurassic and younger deposits of the Great Artesian Basin and Tertiary deposits with elevated basalt flows.

3.4.3 Water resources

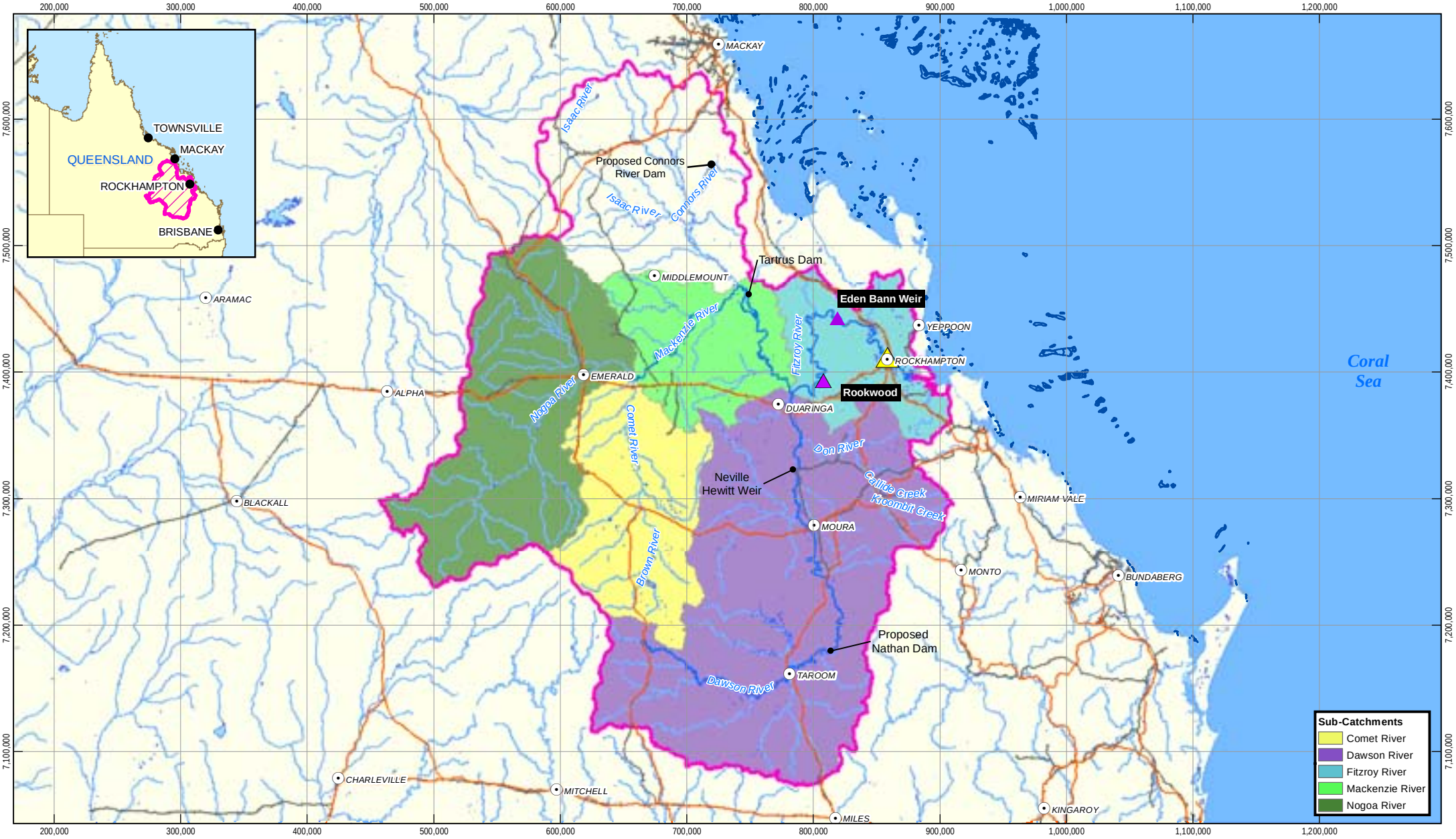
The Fitzroy Basin is the largest catchment of Australia's eastern seaboard, and is second only to the Murray-Darling Basin as Australia's largest catchment. It extends over an area of approximately 142,000 km^2 of central and eastern Queensland about the Tropic of Capricorn. It consists of six major sub-catchments, namely: Isaac; Nogoa; Comet; Mackenzie; Dawson; and Fitzroy as shown in Figure 5).

Major river systems and waterways within the Fitzroy Basin include the Fitzroy, Isaac, Connors, Mackenzie, Comet, Brown, Nogoa, Kroombit, Dawson, and the Don (Callide Creek) Rivers (Figure 5).

The Fitzroy River forms at the junction of the Mackenzie and Dawson Rivers. It drains to the east through Rockhampton to the Coral Sea. It is typically a large river with a wide alluvial plan and low gradient (Marsden

and Power, 2007). The Fitzroy River experiences extremes in flow, with low to minimal flows and conversely very high flows occurring generally annually.

A number of dams and weirs are located along the Fitzroy, Mackenzie and Dawson Rivers, and their tributaries. In addition, the construction of Nathan Dam on the Dawson River, 315 km upstream of the confluence, is proposed, as is the construction of Connors River Dam on the Connors River (235 km north-east of Rockhampton), a tributary of the Mackenzie River (Figure 5).



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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA94)
Grid: Map Grid of Australia 1994, Zone 55

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LEGEND

- Proposed Weir Locations
- Fitzroy Barrage
- Waterway
- River of Interest
- Highway
- Railway
- Fitzroy Catchment
- Lakes

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Lower Fitzroy River Infrastructure Project

Job Number	41-20736
Revision	A
Date	14 SEP 2010

Fitzroy Basin

Figure 5

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Data Source: © Navigate 2008. Based on data provided under licence from Navteq 2008: Roads, Waterways, State Boundary - 2008; Sunwater: Waterways, Lakes, Fitzroy Basin, Weir Locations - 2008; © Copyright Commonwealth of Australia (Geoscience Australia) 2007: Populated Places - 2007. DERM: Sub-basins 2008. Created by: MG

Land use practices in the Fitzroy Basin, such as agriculture and mining, have also led to various pressures being placed on the aquatic ecosystems and species that occur. During high flow conditions in waterways within the Fitzroy Basin, high sediment levels occur as large areas of agricultural land are eroded. These excess sediments are known to be effective transport mechanisms for nutrients (Johnston *et al*., 2008), which do lead to large algal blooms, once high flow conditions subside.

Similarly, metals in the catchment are able to bind to sediments that are transported downstream, leading to potentially high metal concentrations building up in the sediments as flow subsides. However, in the Fitzroy Basin the contributions of sediment transport to dissolved metal concentrations in the water column is not well understood. The naturally high mineral concentrations which occur in the Basin may also contribute to high metal concentrations in the water column (Taylor and Jones, 2000).

Waterways in the Fitzroy Basin are considered to be highly dynamic, due to largely the variable and extreme climatic patterns that the region is exposed to. Thus, the water quality of these systems is typically both temporally and spatially variable.

3.5 Biological environment

The Eden Bann Weir is located on the Fitzroy River, along the border of the Brigalow North and Brigalow South Bioregions; both Bioregions are characterised by the presence of Brigalow (*Acacia harpophylla*). These Bioregions incorporate a variety of landscapes ranging from undulating hills, low ridges and valleys to flat alluvial plains. The Bioregions are characterised by large areas of habitat loss. This is mainly due to agricultural clearing in the lowland and riparian areas. Vegetation and fauna communities have declined significantly due to this clearing. The vegetation in these regions varies with topography. Dominant vegetation communities include eucalypt woodlands, grasslands, brigalow-belah forests (*Acacia harpophylla*, *Casuarina cristata*), semi-evergreen vine thickets and open forests of ironbarks (*Eucalyptus* spp.), bloodwoods (*Corymbia* spp.), poplar box (*Eucalyptus populnea*), spotted gum (*Corymbia citriodora*) and cypress pine (*Callitris glaucophylla*).

Habitat reserves within the region are highly fragmented. Conservation opportunities are limited and depend heavily on off-reserve, community-based programs. Ecosystems within these Bioregions that have high conservation priority (based on low representation in reserve systems) are vine scrubs, bluegrass communities, poplar box/brigalow, blackwood and gidgee (DEWHA, 2009a; DEWHA, 2009b).

The riparian fringe within the Eden Bann Weir project area is typically narrow adjacent to grazing areas. Adjacent to rocky hills, the riparian zone is wider and more extensively vegetated. A number of creeks join the Fitzroy River and the vegetation present along these creeks represents a natural, complex system. It is anticipated that this vegetation provides habitat for a range of species. River flow at this section is modified by the existing Eden Bann Weir.

The Rookwood site is located in the northern extent of the Brigalow Belt South Bioregion. The Bioregion contains a variety of landscapes ranging from undulating hills, low ridges and valleys to flat alluvial plains. Dominant vegetation communities include eucalypt woodlands, grasslands, brigalow-belah forests (*Acacia harpophylla, Casuarina cristata*), semi-evergreen vine thickets and open forests of ironbarks (*Eucalyptus* spp.), bloodwoods (*Corymbia spp.*), poplar box (*Eucalyptus populnea*), spotted gum (*Corymbia citriodora*) and cypress pine (*Callitris glaucophylla*).

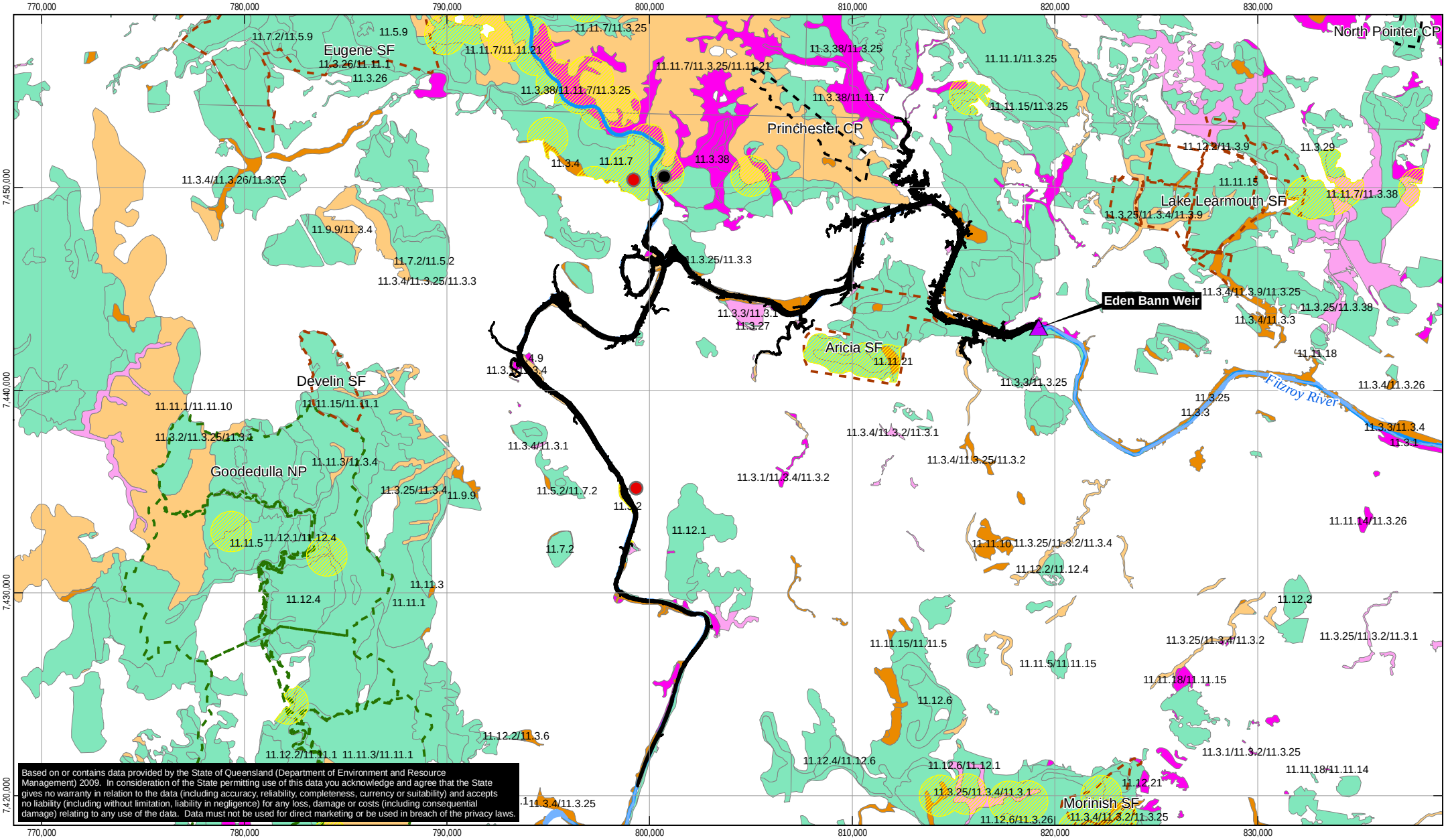
The Brigalow Belt South Bioregion is characterised by high levels of habitat loss. In particular, the lowlands (e.g. alluvial and clay plains) and riparian zones have been extensively cleared for agriculture. Vegetation and fauna communities associated with these landscapes have also experienced decline. Most remnant vegetation in this Bioregion persists within hills and ranges. Remnant vegetation in the study area has a high proportion of endemic and naturally rare flora and fauna.

A number of Regional Ecosystem (RE) communities are predicted to occur (as determined by DERM's RE mapping version 6) within the project area and are described in Table 2 and shown in Figure 6 and Figure 7.

Table 2 Regional ecosystems mapped as occurring within the project area

Eden Bann Weir			Rookwood		
RE	**RE Short Description**	**VM Act**	**RE**	**RE Short Description**	**VM Act**
11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	Endangered	11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	Endangered
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	Of concern	11.3.2	*Eucalyptus populnea* woodland on alluvial plains	Of concern
11.3.3	*Eucalyptus coolabah* woodland on alluvial plains	Of concern	11.3.3	*Eucalyptus coolabah* woodland on alluvial plains	Of concern
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus spp.* tall woodland on alluvial plains	Of concern	11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus spp.* tall woodland on alluvial plains	Of concern
11.3.9*	*Eucalyptus platyphylla, Corymbia spp.* woodland on alluvial plains	Least concern	11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* fringing drainage lines	Least concern
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* fringing drainage lines	Least concern	11.11.1*	*Eucalyptus crebra +/- Acacia rhodoxylon* woodland on old sedimentary rocks with varying degrees of metamorphism and folding	Least concern
11.3.29 *	*Eucalyptus crebra*, *Eucalyptus exserta*, *Melaleuca spp*. woodland on alluvial plains	Least concern	11.12.2*	*Eucalyptus melanophloia* woodland on igneous rocks	Least concern
11.3.38*	*Eucalyptus tereticornis, Melaleuca viridiflora, Corymbia tessellaris* and *Eucalyptus fibrosa* subsp. (Glen Geddes) tall woodland with a grassy ground layer. Occurs on alluvial plains and broad drainage lines derived from serpentine	Endangered			
11.11.7*	*Eucalyptus fibrosa* subsp. (Glen Geddes), *E. xanthope* woodland on serpentine	Least concern			
11.11.15*	*Eucalyptus crebra* woodland on deformed and metamorphosed sediments and interbedded volcanics	Least concern			
11.11.21*	Semi-evergreen vine thicket on serpentine	Of concern			
11.12.1*	*Eucalyptus crebra woodland* on igneous rocks	Least concern			
11.12.2*	*Eucalyptus melanophloia* woodland on igneous rocks	Least concern			

*Nangura (2007) indicates that these REs do not connect with the inundation but are recorded in the surrounding landscape.



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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA94)
Grid: Map Grid of Australia 1994, Zone 55

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Proposed Weir Location
Fitzroy River Turtle
Brigalow Scaly Foot Inundation
Stage 2 & 3

Waterway
Essential Habitat

Protected Areas of Queensland
National Park
Conservation Park
State Forest

Regional Ecosystems
Endangered - Dominant
Endangered - Sub-dominant
Of Concern - Dom
Of Concern - Sub-dom
Least Of Concern

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Lower Fitzroy River Infrastructure Project

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Revision F
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Regional Ecosystems & Essential Habitat Eden Bann

Figure 6

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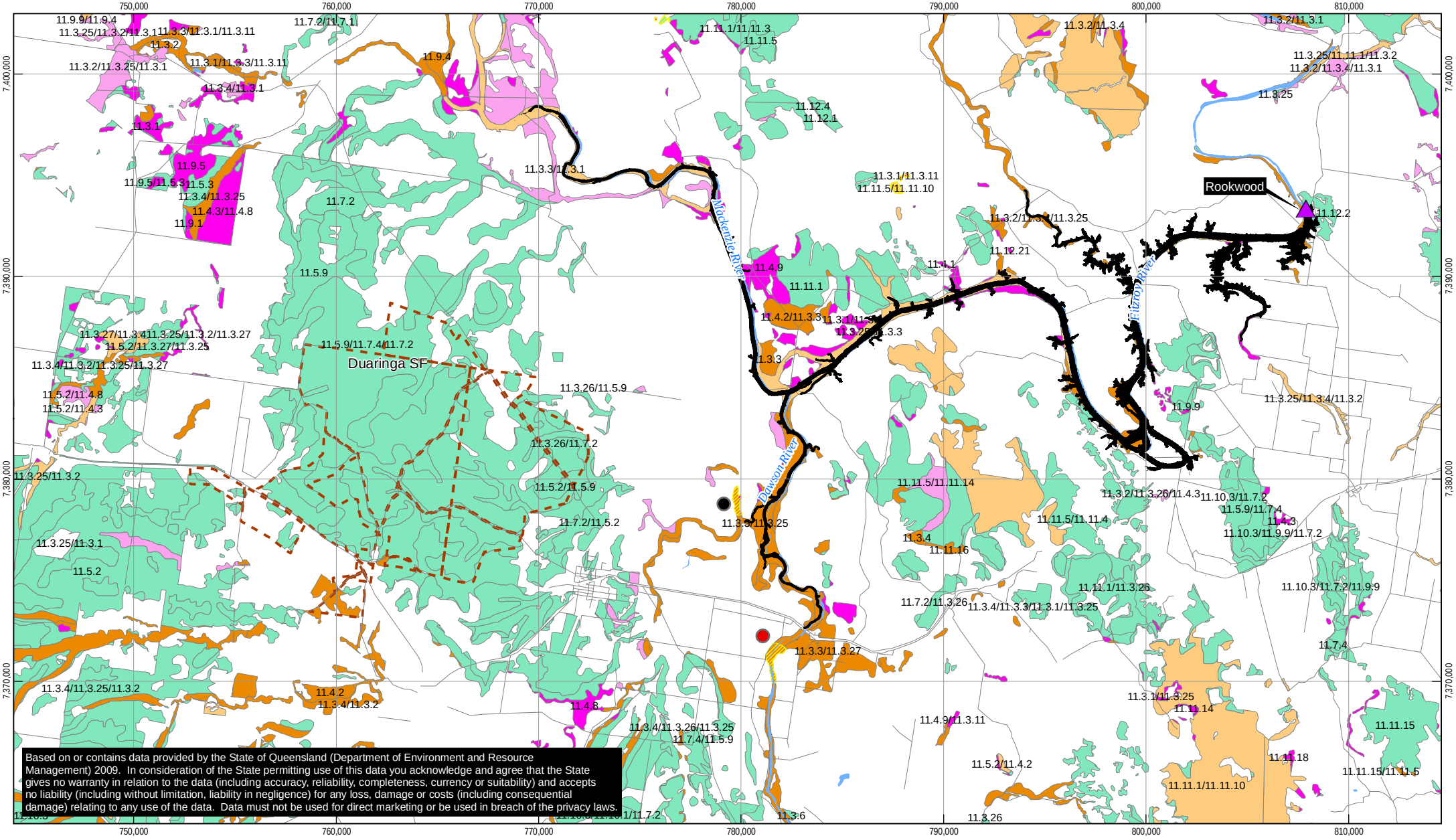
Data Source: DERM, Regional Ecosystems, Version 6b/2009, Regulated Regrowth/2009; Sunwater: Weirs - 2008; GA - Watercourse Lines/2007. Created by DB



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0 2.5 5 7.5 10

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA94)
Grid: Map Grid of Australia 1994, Zone 55

N

Proposed Weir Location
Fitzroy River Turtle
Brigalow Scaly Foot

Waterway
Inundation Stage 1 & 2
Essential Habitat
State Forest

Regional Ecosystems
Endangered - Dominant
Endangered - Sub-dominant
Of Concern - Dom
Of Concern - Sub-dom
Least Of Concern

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Lower Fitzroy River Infrastructure Project

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Date 05 SEP 2010

Regional Ecosystems & Essential Habitat Rookwood

Figure 7

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Data Source: DERM, Regional Ecosystems, Version 6b/2009, Regulated Regrowth, Version 2/2009; Sunwater: Weirs - 2008; GA - Watercourse Lines/2007. Created by DB.

Small areas of Essential Habitat are mapped for the brigalow scaly-foot (*Paradelma orientalis)* (but outside of the inundation extent (Figure 6 and Figure 7). This species is listed as 'Vulnerable' under the EPBC Act and NC Act. Essential Habitat for the Fitzroy River turtle (*Rheodytes leukops*) has also been mapped in the project area. Additional areas identified as important habitat for the species within the Fitzroy River include: Glenroy Crossing, Redbank Crossing, Marlborough Creek and Alligator Creek (Figure 6 and Figure 7). The Fitzroy River turtle is endemic to the Fitzroy catchment.

Within the project footprint, there is one area of Conservation Estate. This area is a designated State forest (Aricia State Forest) (Figure 6).

The freshwater fish community within the Fitzroy Catchment contains a unique combination of semi-arid/temperate and tropical/sub-tropical species. No conservation-significant species are recorded from the system, however two endemic species (southern saratoga (*Scleropages leichardti*) and leathery grunter (*Scortum hillii*)), and one endemic sub-species (golden perch (*Macquaria ambigua oriens*)) (Stuart *et al*., 2007) are known to occur.

The Fitzroy Catchment supports a high diversity of freshwater turtles, with six species occurring within the catchment, namely Fitzroy River turtle (*Rheodytes leukops*); white-throated snapping turtle (*Elseya albagula*); saw-shelled turtle (*Elseya latisternum*); Krefft's river turtle (*Emydura krefftii*); broad-shelled river turtle (*Chelodina expansa*); and eastern snake-necked turtle (*Chelodina longicollis*). All turtle species have been previously recorded within the project area. The white-throated snapping turtle is endemic to the Fitzroy, Burnett and Mary River Catchments and has been recommended for 'Endangered' listing under the NC Act (Limpus *et al.,* 2007).

Estuarine crocodiles (*Crocodylus porosus*) have been listed as 'Vulnerable' under the NC Act, and 'Migratory' and 'Marine' under the EPBC Act. Estuarine crocodiles are present at low densities within the Eden Bann Weir impoundment and are occasionally observed upstream of Rookwood (Limpus *et al.*, 2007), however they are uncommon beyond Glenroy Crossing on the Fitzroy River.

The platypus (*Ornithorhynchus anatinus*) is listed as 'Special Least Concern' common wildlife under the NC Act. A record does exist within the project area for this species on the lower Dawson River (DERM WildNet Database recorded in March 2000).

An EPBC Act Protected Matters Search was undertaken for the project area with a 2 km buffer. Identified ecological communities and threatened species that have been previously recorded in the area or have the potential to occur in the area and/or are known to occur in the area and are presented in Appendix A. Given that the Fitzroy River discharges to the GBRWHA the search extent included reaches of the river below Eden Bann Weir through to the Fitzroy Barrage and into the estuary. These records are also presented in Appendix A. In addition, species listed under the NC Act were identified and included.

The endangered threatened ecological community Brigalow (*Acacia harpophylla* dominant and co-dominant) an 'Endangered' ecological community is known to occur in the project area and may be impacted upon. Flora species known to occur and that may be potentially impacted include the vulnerable black ironbox (*Eucalyptus raveretiana*). A 'Rare' seasonally emergent aquatic plant (*Aponogeton queenslandicus*) listed under the NC Act is also known to occur but is unlikely to be impacted. Three threatened bird species are known to occur in the project area. The 'Vulnerable' Fitzroy River Turtle (*Rheodytes leukops*) is known to occur.

The project area has experienced extensive clearing for agricultural purposes. Only a narrow fringe of riparian vegetation remains. The clearing of agricultural land has reduced species richness and diversity. However, foraging habitat for some species has been retained. Creeks and off-stream billabongs provide foraging resources for a range of terrestrial fauna species.

3.6 Noise, vibration and air quality

Due to the rural nature of the LFRIP area, background noise levels are limited to animals and other natural sounds.

There are no significant sources of vibration in the area. The closest sources of major vibration are the Bruce and Capricorn Highways.

Air quality in the area is considered to be good as there are no significant sources of pollutants.

Indications are that one or two sensitive receptors (homesteads and work sheds) may be associated with the project.

3.7 Transport

The project area is serviced by the Bruce Highway and the Capricorn Highways. Access to the weir sites is via gravel road. New access roads will be required, along with augmentation to existing roads and tracks.

4 Potential impacts

4.1 Overview

Impacts arising during the construction phase of the LFRIP relate largely to disturbance (erosion) and nuisance type impacts (such as noise and dust) as a result of land clearing, site mobilisation and physical construction of the infrastructure. Construction phase impacts are considered to be of short-term duration, given an estimated two-year construction period (allowing for the majority of construction activities to take place during the drier months).

During operation, water stored behind the weir wall will be contained within the bed and banks of the river and the weirs will be drawn down over time to release water to the downstream reaches.

Medium- and long-term impacts arising during the operational phase may be a result of:

- The weir infrastructure itself acting as a barrier;
- Inundation/ponding behind the weir; and
- Altered flow regimes.

4.2 Land use, land tenure and ownership

Sixty-one lots (comprising 26 properties) will potentially be impacted as a result of inundation associated with raising Eden Bann Weir to Stage 3. This includes 11 properties currently impacted by inundation as a result of the existing Eden Bann Weir. Approximately 53 lots (comprising 29 properties) will potentially be impacted

by inundation as a result of construction and operation of a weir at Rookwood to Stage 2. A further 13 properties comprising 17 lots are located between Rookwood and Eden Bann Weir's inundation extent and may be impacted as a result of releases made from Rookwood. 9 properties comprising 30 lots are located between Eden Bann Weir and the Fitzroy Barrage pond and may be impacted by releases made from Eden Bann Weir, although this section of river is already regulated and experiences current releases from the weir. Land liaison officers will be appointed to consult with potentially directly affected landholders to facilitate discussions around land acquisition and compensation.

Unallocated State land within the bed and banks of the Fitzroy, Dawson and Mackenzie Rivers will also be affected.

4.3 Socio-economic environment

There is the potential for some community disruption during construction and operation of the proposed LFRIP. Community consultation will take place to monitor these impacts and identify if mitigation is required. Some local employment opportunities may arise during the construction phase of the LFRIP. Local businesses will be supported through the provision of contractors, machinery and support services.

Potential negative social and economic impacts associated with the LFRIP may include: nuisances and disruptions due to construction activities; increased pressure on services; loss of land or access to land; altered flood levels, cattle bogging. Potential positive social and economic impacts arising from the LFRIP may include: improved flood access; employment and business opportunities; regional development; improved reliability of water supply; to name a few.

No construction camp is planned for either site, and workers will be accommodated in nearby towns or Rockhampton and transported daily to the site.

As there is minimal recreational usage along the LFRIP sections of the Fitzroy River, it is not anticipated that there will be impacts on recreational activities associated with the development. It is not the intention of the LFRIP to encourage recreational use of the river further and no provisions have been made to provide facilities in this regard (such as boat launch sites, picnic facilities and amenities).

Cook *et al* (2007) identified no sites or structures likely to be impacted by the LFRIP. Furthermore it was predicted that given the use of the river, it is unlikely that items of non-indigenous heritage would be discovered during construction (Cook *et al*, 2007).

A full social and economic impact assessment will be completed as part of the EIS, which will identify community profiles and mitigation measures for those potential impacts associated with the development.

4.4 Native Title and Indigenous cultural heritage

The project will undertake Native Title assessments, such as tenure history investigations, in relation to the project areas. Further to this assessment, an analysis will be conducted as to how to grant project approval with respect to land tenures in accordance with the provisions of the Commonwealth's *Native Title Act 1993* and *Native Title (Queensland) Act 1993.*

Preliminary surveys within the project area indicated the presence of Aboriginal cultural heritage. In order to manage potential impacts on Aboriginal cultural heritage the Proponents have initiated the development of a CHMP for the project that will address the duty of care requirements under the ACH Act. Pursuant to Part 7

of the ACH Act notifications were sent to each group advising of the Proponent's intention to develop a CHMP. Development of CHMPs with each party are well progressed.

4.5 Physical environment

4.5.1 Climate

Potential impacts on climate that may arise from the development of either Eden Bann Weir and/or Rookwood Weir are associated with anthropogenic actions that contribute to Climatic Change.

The manufacturing processes involved with concrete and steel for the structures, as well as increased volumes of heavy vehicles transporting materials and construction workers will be considered as part of the EIS process and be included in the EIS.

Potential mitigation measures will be identified and developed as part of the Climate Change and Sustainability chapters of the EIS. These measures will consider future climate projections and the impact the project may have on these projections.

Frequency and severity of flooding as well as incremental increases to flooding of land, will be modelled and used to inform design parameters of the weir infrastructure itself, but also of ancillary infrastructure such as roads and river crossings.

4.5.2 Soils and Geology

It is not anticipated that any major impacts on the soils and geology of the project areas (both Eden Bann Weir and Rookwood Weir sites) will be identified from the proposed developments.

Geological impacts include a potential for increased seismicity, due to the volume of water putting pressure on the underlying strata. However, a full design brief has been prepared by the Engineering Design team at GHD and no significant seismic impacts are anticipated. In addition, consideration will be given to erosion protection measures required. As with all weir and dam developments, the proposed infrastructure will be designed in accordance with all regulatory codes and standards.

In the event that Acid Sulfate Soils are present and disturbed during construction works, appropriate management measures will be developed, and addressed in a Construction Environmental Management Plan.

There is a potential for some GQAL to be impacted by the raised water levels associated with the FSL requirements at each site. However, it is not anticipated that large areas of GQAL will be lost.

4.5.3 Water resources

The obstruction of flow that results from the construction and operation of barriers, such as weirs, has the potential to exacerbate the water quality issues resulting from land use practices occurring in the landscape adjacent to waterways of the Fitzroy Basin. In particular, reductions in flow and flushing may lead to the accumulation of nutrients, sediments and metals both within water storages upstream of weirs, and downstream of such structures. In addition, ponding of water over extended periods may result in alterations to the physical and chemical characteristics of the water across the depth gradient (i.e. temperature and dissolved oxygen levels).

The inundation of naturally occurring habitats, such as riffles and runs, which are characterised by physical and chemical features, may result in finer scale changes to water quality, thereby reducing the heterogeneity of the aquatic environment. This has the potential to impact upon aquatic species and communities which are reliant on such micro-habitats.

For an assessment of potential impacts on aquatic species and communities to be undertaken, it is important that an understanding of the general water quality characteristics of the waterways potentially impacted by the raising of Eden Bann Weir and/or the construction of a weir at Rookwood be garnered. This information will be provided in the EIS.

Flow characteristics and operational regimes will adhere to the provisions of the WRP and be implemented through the ROP.

4.6 Biological environment

There is the potential for terrestrial and aquatic flora and fauna to be impacted during both construction and operation phases of the proposed LFRIP.

Construction activities which may have short-term impacts upon flora and fauna may include:

- Vehicle and plant movement to, from and around the construction site;
- Removal of vegetation within the immediate construction footprint, storage/stockpiling areas and access tracks;
- Acquisition of materials (aggregate) for use in construction; and
- Flow diversion/control.

Impacts associated with these construction activities may include: individual fauna mortality; disruption to behaviour of localised wildlife assemblages; loss of habitat; increased predation and competition; degradation of habitats (including water quality); and alteration to flow regimes.

During operation, potential impacts may include:

- Fauna injury and mortality (individual fauna deaths) as a result of interaction with the weir infrastructure itself;
- Loss of habitat, particularly within the riparian fringe (terrestrial and semi-aquatic fauna) through inundation. Loss of vegetation as a result of inundation is considered 'clearing' in terms of the *Vegetation Management Act 1999*. Of the 1,690 ha of potential inundation as a result of raising Eden Bann Weir to Stage 3, an estimated 560 ha of RE (vegetation) may be cleared (inundated). Similarly, of the 1,930 ha potentially inundated as a result of building Rookwood Weir and raising it to Stage 2, an approximate 1,053 ha of RE (vegetation) may be cleared (inundated);
- Alteration and/or transformation of aquatic habitat from lotic to lentic due to ponding as a result of water storage behind the weir;
- Inhibited up- and downstream aquatic fauna passage as a result of the weir acting as a barrier. A waterway barrier works approval will be required under the *Fisheries Act 1994* and a Fishway Design Team has been established (inclusive of Queensland Fisheries' representatives) to address potential impacts on fish passage a result of the LFRIP;

- Fragmentation of riparian habitat, loss of movement corridors and connectivity due to inundation of riparian vegetation; and
- Changes to water quality and flow regimes, for example reduced oxygen levels, as a result of ponding, conversion of lotic to lentic upstream environments and releases to downstream environments.

Detailed assessment as part of the EIS will evaluate the nature and extent of the potential impacts and provide an indication as to the measures available to avoid and/or minimise the impacts, and where avoidance is not possible, mitigate and manage the impact to acceptable levels.

4.7 Noise, vibration and air quality

During construction, it is anticipated that there will be a localised increase in noise and vibration due to increased heavy traffic and construction activities. Air quality also has the potential to become compromised due to the increased risk of dust associated with construction activities and increased travel on gravel roads.

In order to minimise these risks, a desktop study is proposed to identify current ambient air and noise levels. These results will be used to identify all potential impacts to the environment and surrounding communities.

The EIS will discuss impacts associated with increases in noise and vibration and decreased air quality. Mitigation measures will be identified where necessary and incorporated into the Construction Environmental Management Plan.

There are not expected to be noise, vibration or air quality impacts associated with operations.

4.8 Transport

Traffic and transport considerations during operation of the LFRIP are considered negligible and likely to be restricted to maintenance and inspection vehicles.

Construction traffic and transport considerations will be assessed as part of the EIS in accordance with Transport and main Roads guidelines.

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Appendix A

EPBC Act Protected Matters Search

Protected matters search – project area

Protected matters search – downstream, estuarine and marine components

Protected matters search – project area

Species name	Common name	EPBC Act[7]	NC Act[8]	Occurrence
Threatened ecological communities				
Brigalow (*Acacia harpophylla* dominant and co-dominant)	-	E	-	Known
Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin	-	E	-	Unlikely
Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar Bioregions	-	E	-	May
Weeping Myall woodlands	-	E	-	Unlikely
Flora				
Actephila sessilifolia	-	-	R	Unlikely
Aponogeton queenslandicus	-	-	R	Known
Atalaya calcicola	-	-	R	Unlikely
Bursaria reevesii	-	-	V	Unlikely
Cadellia pentastylis	ooline	V	V	May
Capparis humistrata	-	-	E	Unlikely
Capparis thozetiana		V	V	Unlikely
Cerbera dumicola	-	-	R	Unlikely
Corymbia xanthope	Glen Geddes bloodwood	V	V	Unlikely
Cycas megacarpa		E	E	Unlikely
Cycas ophiolitica		E	E	Unlikely
Dansiea elliptica	-	-	R	Unlikely
Dichanthium queenslandicum	king blue grass	V	V	Unlikely
Dichanthium porrecta	finger panic grass	E	R	Unlikely
Dichanthium setosum		R	R	Unlikely
Eucalyptus raveretiana	black ironbox	V	V	Known
Gossypium sturtianum	Sturt's desert rose	-	R	Unlikely
Hakea trineural	three-veined hakea	V	V	Unlikely
Leucopogon cuspidatus	-	V	-	Unlikely
Livistona nitida	Carnavon fan palm	-	R	Unlikely
Macropteranthes fitzalanii	-	-	R	Unlikely
Macropteranthes leiocaulis	-	-	R	Unlikely

[7] CE – critically endangered; E – endangered; V – vulnerable, Mi – migratory; and Ma - marine

[8] C – common; E – endangered; R – rare; and V - vulnerable

Species name	Common name	EPBC Act[7]	NC Act[8]	Occurrence
Macrozamia serpentina	-	-	E	May
Marsdenia brevifolia	-	V	V	Unlikely
Marsdenia hemiptera	-	-	R	Unlikely
Neoroepera buxifolia	-	V	V	Unlikely
Olearia spp	-	-	E	Unlikely
Parsonsia larcomensis	-	V	V	Unlikely
Parsonsia lenticellata	narrow leaved parsoni	-	R	Unlikely
Paspalidium scrabrifoliium	-	-	R	May
Pimelea leptospermoidies	-	V	R	Unlikely
Pultenaea setulosa	-	V	V	Unlikely
Quassia bidwillii	quassia	V	V	Unlikely
Stackhousia tryonii	-	-	R	Unlikely
Fauna				
Birds				
Ephippiorhynchus australis	black-necked stork	-	V	Known
Erythrotriorchis radiatus	red goshawk	V	E	May
Geophaps scripta scripta	squatter pigeon (southern)	V	V	Known
Melithreptus gularis	black-chinned honeyeater	-	R	Known
Neochmia ruficauda ruficauda	star finch (eastern), star finch (southern)	E	E	May
Nettapus coromandelianus	cotton pygmy-goose	Ma	R	Likely
Ninox strenua	powerful owl	-	V	Likely
Rostratula australis/Rostratula benghalensis s. lat.	Australian painted snipe	V	V	May
Turnix melanogaster	black-breasted button-quail	V	V	Unlikely
Mammals				
Chalinolobus dwyeri	large-eared pied bat, large pied bat	V	R	May
Dasyurus hallucatus	northern quoll	E	-	May
Macroderma gigas	ghost bat	-	V	May
Nyctophilus timoriensis (south-eastern form)	eastern long-eared bat	V	V	May
Onychogalea fraenata	bridled nailtail wallaby	E	E	Unlikely
Reptiles				

Species name	Common name	EPBC Act[7]	NC Act[8]	Occurrence
Denisonia maculata	ornamental snake	V	V	May
Egernia rugosa	yakka skink	V	V	May
Furina dunmalli	Dunmall's snake	V	V	May
Rheodytes leukops	Fitzroy River turtle	V	V	Known
Paradelma orientalis	brigalow scaly-foot	V	V	May
Migratory				
Migratory terrestrial species				
Haliaeetus leucogaster	white-bellied sea-eagle	Mi	C	May
Hirundapus caudacutus	white-throated needletail	Mi	C	May
Hirundo rustica	barn swallow	Mi	C	May
Merops ornatus	rainbow bee-eater	Mi	C	Known
Monarcha melanopsis	black-faced monarch	Mi	C	May
Monarcha trivirgatus	spectacled monarch	Mi	C	May
Myiagra cyanoleuca	satin flycatcher	Mi	C	May
Rhipidura rufifrons	rufous fantail	Mi	C	May
Migratory wetland species		Mi	C	
Ardea alba/Ardea modesta	great egret, white egret	Mi	C	Likely
Ardea ibis	cattle egret	Mi	C	Likely
Gallinago hardwickii	Latham's snipe, Japanese snipe	Mi	C	May
Nettapus coromandelianus albipennis	Australian cotton pygmy-goose	Mi	R	Likely
Numenius minutus	little curlew, little whimbrel	Mi	C	May
Rostraula australis/Rostratula benghalensis s. lat.	Australian painted snipe	Mi, V	V	May
Migratory marine birds				
Apus pacificus	fork-tailed swift	Mi	C	May
Ardea alba/Ardea modesta	great egret, white egret	Mi	C	Likely
Ardea ibis	cattle egret	Mi	C	Likely
Migratory marine species				
Crocodylus porosus	estuarine crocodile, salt-water crocodile	Mi	V	Known

Species name	Common name	EPBC Act[7]	NC Act[8]	Occurrence
Other migratory species				
Tringa stagnatilis	marsh sandpiper	Mi	C	Unlikely

Protected matters search – downstream, estuarine and marine environment

Species name	Common name	EPBC Act[9]	NC Act[10]	Occurrence
Threatened ecological communities				
Brigalow (*Acacia harpophylla* dominant and co-dominant)	-	E	-	Unlikely
Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar Bioregions	-	E	-	May (downstream of Eden Bann Weir) Unlikely (estuary)
Weeping Myall woodlands	E			Unlikely
Flora				
Capparis thozetiana	-	V	V	Unlikely
Corymbia xanthope	Glen Geddes bloodwood	V	V	May
Cossinia australiana	cossinia	E	E	May
Cycas megacarpa	-	E	E	Unlikely
Cycas ophiolitica	Marlborough blue	E	E	Likely
Eucalyptus raveretiana	black ironbox	V	V	Known
Hakea trineural	three-veined hakea	V	V	Unlikely
Leucopogon cuspidatus	-	V	-	May (downstream of Eden Bann Weir) Unlikely (estuary)
Marsdenia brevifolia	-	V	V	May
Neoroepera buxifolia	-	V	V	Unlikely
Parsonsia larcomensis	-	V	V	Unlikely
Pimelea leptospermoidies	-	V	R	May
Pultenaea setulosa	-	V	V	May
Fauna				
Birds				
Epthianura crocea macgregori	yellow chat (Dawson)	CE	E	Likely
Erythrotriorchis radiatus	red goshawk	V	E	May
Geophaps scripta scripta	squatter pigeon (southern)	V	V	Known
Macronectes giganteus	southern giant petrel	E, Mi	E	Unlikely

[9] CE – critically endangered; E – endangered; V – vulnerable, Mi – migratory; and Ma - marine

[10] C – common; E – endangered; R – rare; and V - vulnerable

Species name	Common name	EPBC Act[9]	NC Act[10]	Occurrence
Neochmia ruficauda ruficauda	star finch (eastern), star finch (southern)	E	E	May
Pterodroma neglecta neglecta	Kermadec petrel (western)	V	C	May
Rostratula australis/Rostratula benghalensis s. lat.	Australian painted snipe	V, Ma, Mi	V	May
Turnix melanogaster	black-breasted button-quail	V	V	Unlikely
Poephila cincta cincta	black-throated finch	V	V	May
Mammals				
Chalinolobus dwyeri	large-eared pied bat, large pied bat	V	R	May
Dasyurus hallucatus	northern quoll	E	-	May
Nyctophilus timoriensis (south-eastern form)	eastern long-eared bat	V	V	May
Reptiles				
Caretta caretta	loggerhead turtle	E, Mi	E	n/a
Chelonia mydas	green turtle	V, Mi	V	n/a
Denisonia maculata	ornamental snake	V	V	Likely
Dermochelys coriacea	leathery turtle	E, Mi	E	n/a
Egernia rugosa	yakka skink	V	V	May
Eretmochelys imbricata	hawksbill turtle	V, Mi	V	n/a
Furina dunmalli	Dunmall's snake	V	V	May
Lepidochelys olivacea	pacific ridley	E, Mi	E	n/a
Natator depressus	flatback turtle	V, Mi	V	n/a
Rheodytes leukops	Fitzroy River turtle	V	V	Known
Mammals				
Balaenoptera musculus	blue whale	E, Mi	C	n/a
Dasyurus hallucatus	northern quoll	E	-	May
Megaptera novaeangliae	humpback whale	V, Mi	V	n/a
Nyctophilus timoriensis (south-eastern form)	eastern long-eared bat	V	V	May
Xeromys myoides	water mouse, false water rat	V	V	Unlikely
Sharks				
Pristis zijsron	green sawfish	V	C	n/a
Rhincodon typus	whale shark	V. Mi	C	n/a
Migratory				

Species name	Common name	EPBC Act[9]	NC Act[10]	Occurrence
Migratory terrestrial species				
Haliaeetus leucogaster	white-bellied sea-eagle	Mi	C	May
Hirundapus caudacutus	white-throated needletail	Mi	C	May
Hirundo rustica	barn swallow	Mi	C	May
Merops ornatus	rainbow bee-eater	Mi	C	Known
Monarcha melanopsis	black-faced monarch	Mi	C	May
Monarcha trivirgatus	spectacled monarch	Mi	C	May
Myiagra cyanoleuca	satin flycatcher	Mi	C	May
Rhipidura rufifrons	rufous fantail	Mi	C	May
Migratory wetland species				
Ardea alba/Ardea modesta	great egret, white egret	Mi	C	Likely
Ardea ibis	cattle egret	Mi	C	Likely
Gallinago hardwickii	Latham's snipe, Japanese snipe	Mi	C	May
Nettapus coromandelianus albipennis	Australian cotton pygmy-goose	Mi	R	Likely
Numenius minutus	little curlew, little whimbrel	Mi	C	May
Rostraula australis/Rostratula benghalensis s. lat.	Australian painted snipe	Mi, V	V	May
Migratory marine birds				
Apus pacificus	fork-tailed swift	Mi	C	May
Ardea alba/Ardea modesta	great egret, white egret	Mi	C	Likely
Ardea ibis	cattle egret	Mi	C	Likely
Macronectes giganteus	southern giant petrel	Mi, E	E	Likely (estuary)
Sterna albifrons	little tern	Mi	E	Likely (estuary)
Migratory marine species				
Mammals				
Baleanoptera edeni	Bryde's whale	Mi	C	Marine waters
Baleanoptera musculus	blue whale	Mi, E	C	Marine waters
Dugong dugon	dugong	Mi	V	Marine waters
Megaptera novaeangliae	humpback whale	Mi, V	V	Marine waters
Orcaella brevirostris	irriwady dolphin	Mi	R	Marine waters
Orcinus orca	killer whale	Mi	C	Marine waters

Species name	Common name	EPBC Act[9]	NC Act[10]	Occurrence
Sousa chinensis	Indo-Pacific humpback dolphin	Mi	R	Marine waters
Reptiles				
Caretta caretta	loggerhead turtle	Mi, E	E	Marine waters
Chelonia mydas	green turtle	Mi, V	V	Marine waters
Crocodylus porosus	estuarine crocodile, salt-water crocodile	Mi	V	Known
Dermochelys coriacea	leatherback turtle	Mi, E	E	Marine waters
Eretmochelys imbricata	hawksbill turtle	Mi, V	V	Marine waters
Lepidochelys olivacea	Pacific ridley	Mi, E	E	Marine waters
Natator depressus	flatback turtle	Mi, V	V	Marine waters
Sharks				
Rhincodon typus	whale shark	Mi, V	C	Marine waters
Other migratory species				
Calidris acuminata	sharp-tailed sandpiper	Mi	C	May
Chalcophaps indica yamashinai	emerald dove	Mi	C	Unlikely
Childonias leucopterus	white-winged black tern	Mi	C	May
Hydroprogne caspia	Caspian tern	Mi	C	May
Limosa limosa	black-tailed godwit	Mi	C	May
Pandion cristatus	eastern osprey	Mi	C	May
Plegadis falcinellus	glossy ibis	Mi	C	May
Plucvialis fulva	Pacific golden plover	Mi	C	May
Tringa nebularia	common greenshank	Mi	C	May
Tringa stagnatilis	marsh sandpiper	Mi	C	Unlikely

Lower Fitzroy Infrastructure Project

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	V Low G Squires	C Gronow	-	C Gillanders	-	-
2	G Squires	C Gronow C Gillanders		GAWB SunWater		13/10/10 13/10/10

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
3	G Squires	C Gillanders		GAWB SunWater		8/11/10